US009479086B2

(12) United States Patent
McCowen

(10) Patent No.: US 9,479,086 B2
(45) Date of Patent: *Oct. 25, 2016

(54) **ENERGY COLLECTION**

(71) Applicant: **Ion Power Group LLC**, Navarre, FL (US)

(72) Inventor: **Clint McCowen**, Navarre, FL (US)

(73) Assignee: **Ion Power Group, LLC**, Navarre, FL (US)

(*) Notice: Subject to any disclaimer, the term of this patent is extended or adjusted under 35 U.S.C. 154(b) by 0 days.

This patent is subject to a terminal disclaimer.

(21) Appl. No.: **14/242,464**

(22) Filed: **Apr. 1, 2014**

(65) **Prior Publication Data**

US 2014/0210308 A1 Jul. 31, 2014

Related U.S. Application Data

(63) Continuation of application No. 12/255,130, filed on Oct. 21, 2008, now Pat. No. 8,686,575, which is a continuation of application No. 11/358,264, filed on Feb. 21, 2006, now Pat. No. 7,439,712.

(51) **Int. Cl.**

F02B 63/04	(2006.01)
F03G 7/08	(2006.01)
H02K 7/18	(2006.01)
H02N 1/10	(2006.01)
H02N 11/00	(2006.01)
H01M 16/00	(2006.01)

(52) **U.S. Cl.**

CPC ***H02N 1/10*** (2013.01); ***H02N 11/002*** (2013.01); *H01M 16/003* (2013.01)

(58) **Field of Classification Search**

USPC .... 290/1 R

See application file for complete search history.

(56) **References Cited**

U.S. PATENT DOCUMENTS

674,427 A		5/1901	Palencsar	
911,260 A		2/1909	Pennock	
1,014,719 A		1/1912	Pennock	
2,473,819 A		6/1949	Pittman	
3,532,959 A		10/1970	Erickson	
3,663,360 A	*	5/1972	Post	376/147
3,668,065 A	*	6/1972	Moir	376/147
3,780,722 A		12/1973	Swet	
3,946,227 A		3/1976	Bingham	

(Continued)

FOREIGN PATENT DOCUMENTS

CA	2647385	9/2008
EP	1999767 A2	12/2008

(Continued)

OTHER PUBLICATIONS

"Emissivity Values for Common Materials & Non-Metals", Raytek; http://raytek.com/Raytek/en-r0/IREducation/EmissivityNonMetals.htm; 1999.*

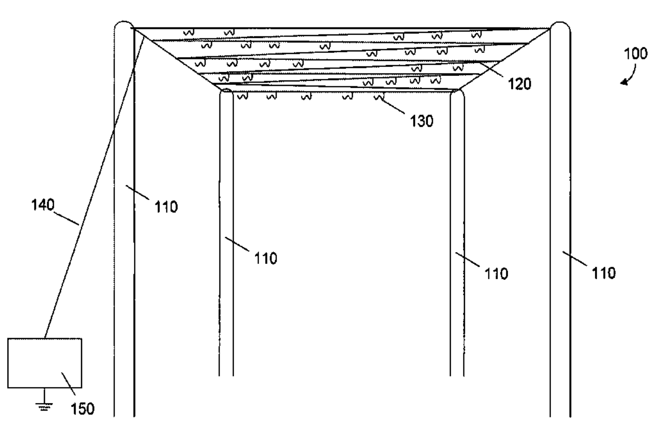
Primary Examiner — Pedro J Cuevas

(74) *Attorney, Agent, or Firm* — Benjamin A. Balser; Next ip Law Group

(57) **ABSTRACT**

An energy collection system may collect and use the energy generated by an electric field. Collection fibers are suspended from a support wire system supported by poles. The support wire system is electrically connected to a load by a connecting wire. The collection fibers may be made of any conducting material, but carbon and graphite are preferred. Diodes may be used to restrict the backflow or loss of energy.

21 Claims, 10 Drawing Sheets



(56) **References Cited**

U.S. PATENT DOCUMENTS

4,079,225	A	3/1978	Warner	
4,092,250	A	5/1978	Sano et al.	
4,104,696	A	8/1978	Cochran, Jr.	
4,146,800	A	3/1979	Gregory et al.	
4,180,056	A	12/1979	Schnabel et al.	
4,201,197	A	5/1980	Dismer	
4,206,396	A	6/1980	Marks	
4,224,496	A	9/1980	Riordan et al.	
4,307,936	A	12/1981	Ochiai	
4,314,192	A	2/1982	Caro	
4,346,478	A	8/1982	Sichling	
4,425,905	A	1/1984	Mori	
4,433,248	A	2/1984	Marks	
RE31,678	E	9/1984	Ochiai	
4,483,311	A	11/1984	Whitaker	
4,489,269	A	12/1984	Edling et al.	
4,512,335	A	4/1985	Mori	
4,653,223	A	3/1987	Mori	
4,653,472	A	3/1987	Mori	
4,676,226	A	6/1987	Mori	
4,809,675	A	3/1989	Mori	
4,852,454	A	8/1989	Batchelder	
4,943,125	A	7/1990	Laundre' et al.	
4,988,159	A	1/1991	Turner et al.	
5,047,892	A	9/1991	Sakata et al.	
5,114,101	A	5/1992	Stern et al.	
5,145,257	A	9/1992	Bryant et al.	
5,379,103	A	1/1995	Zigler	
5,851,309	A	12/1998	Kousa	
5,942,806	A	8/1999	Veliadis	
6,025,591	A	2/2000	Taylor et al.	
6,038,363	A	3/2000	Slater et al.	
6,116,544	A	9/2000	Forward et al.	
6,173,922	B1	1/2001	Hoyt et al.	
6,226,440	B1	5/2001	Lyons	
6,419,191	B1	7/2002	Hoyt et al.	
6,425,391	B1	7/2002	Davoren et al.	
6,735,830	B1	5/2004	Merciel	
6,765,212	B2	7/2004	Goetz et al.	
6,846,447	B2	1/2005	Mbachu et al.	
6,853,447	B2	2/2005	Goetz	
6,894,772	B2	5/2005	Goetz et al.	
6,925,852	B2	8/2005	Susko	
6,974,110	B2	12/2005	Grandics	
7,109,597	B1	9/2006	Bose	
7,128,867	B2	10/2006	Mbachu et al.	
7,231,809	B2	6/2007	Susko	
7,259,475	B2	8/2007	Hong et al.	
7,439,712	B2	10/2008	McCowen	
7,449,668	B2	11/2008	Schutten et al.	
7,478,712	B2	1/2009	McCowen	
7,532,819	B1	5/2009	Triebes et al.	
8,269,401	B1	9/2012	Kim et al.	
8,686,575	B2	4/2014	McCowen	
8,810,049	B2 *	8/2014	McCowen	290/1 R
2002/0026933	A1	3/2002	Gottlieb	
2002/0108892	A1	8/2002	Goetz et al.	
2002/0109094	A1	8/2002	Goetz et al.	
2002/0109835	A1	8/2002	Goetz	
2003/0125630	A1	7/2003	Furnish	
2003/0193319	A1	10/2003	Wood et al.	
2004/0011925	A1	1/2004	Grandics	
2004/0083793	A1	5/2004	Susko	
2004/0094853	A1	5/2004	Mbachu et al.	
2004/0160711	A1	8/2004	Stumberger	
2004/0212945	A1	10/2004	Sprenger et al.	
2005/0101024	A1	5/2005	Mbachu et al.	
2005/0136311	A1	6/2005	Ueda et al.	
2005/0270525	A1	12/2005	Susko	
2007/0107765	A1	5/2007	Schutten et al.	
2007/0195481	A1	8/2007	McCowen	
2007/0218323	A1	9/2007	Sudo et al.	
2007/0223171	A1	9/2007	Guy et al.	
2007/0273206	A1	11/2007	McCowen	
2007/0297892	A1	12/2007	Kildegaard	
2008/0145714	A1	6/2008	Kagami	
2009/0040680	A1	2/2009	McCowen	
2009/0107842	A1	4/2009	Park et al.	
2009/0114495	A1	5/2009	McCowen	
2009/0216292	A1	8/2009	Pless et al.	
2010/0090562	A1	4/2010	McCowen	
2011/0148248	A1	6/2011	Landa	
2012/0043585	A1	2/2012	Guo et al.	
2012/0299559	A1	11/2012	McCowen	
2013/0049531	A1	2/2013	Wang et al.	

FOREIGN PATENT DOCUMENTS

RU	2008137622	2/2007
WO	2007098341	8/2007

* cited by examiner

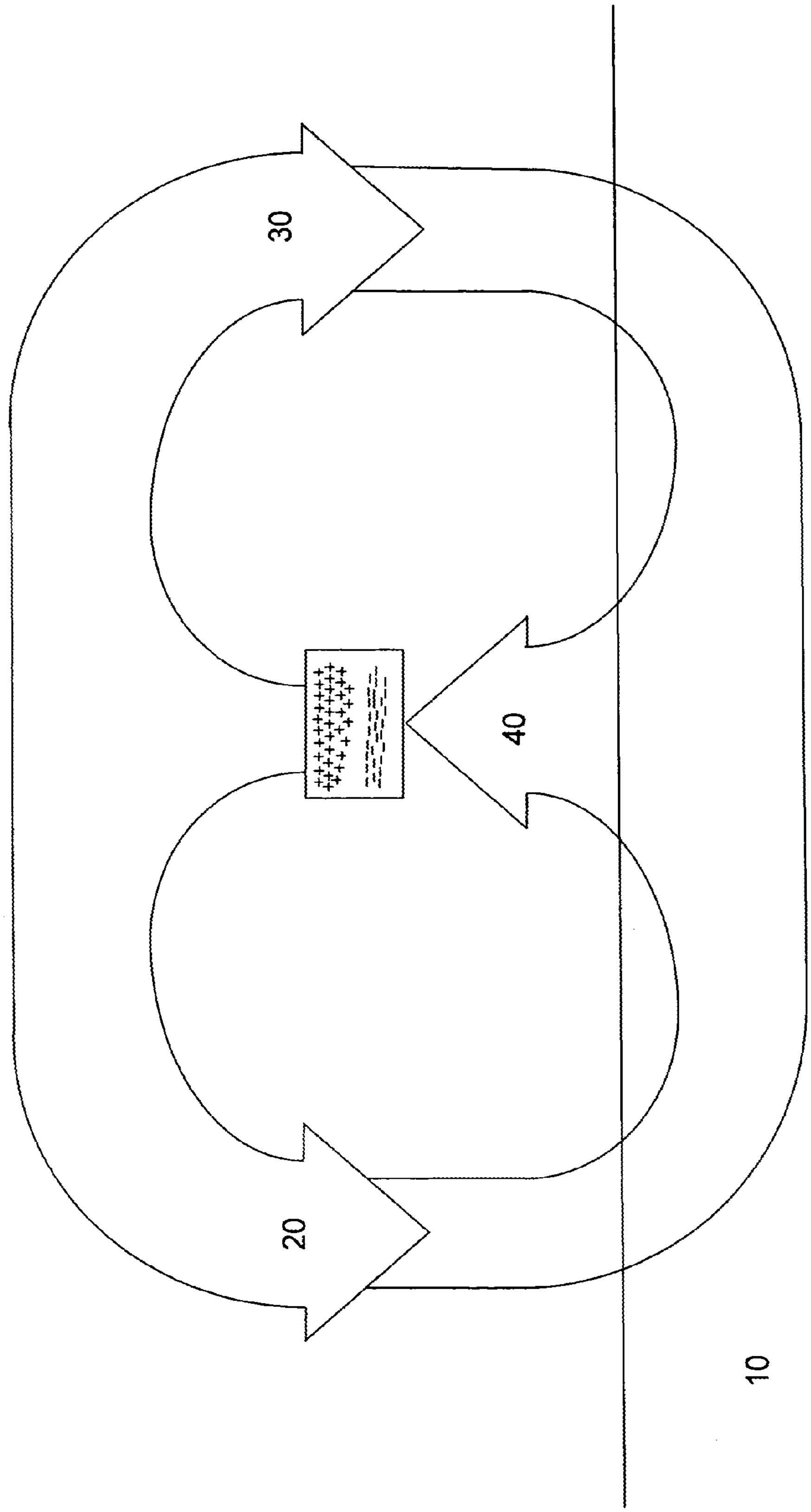


FIGURE 1

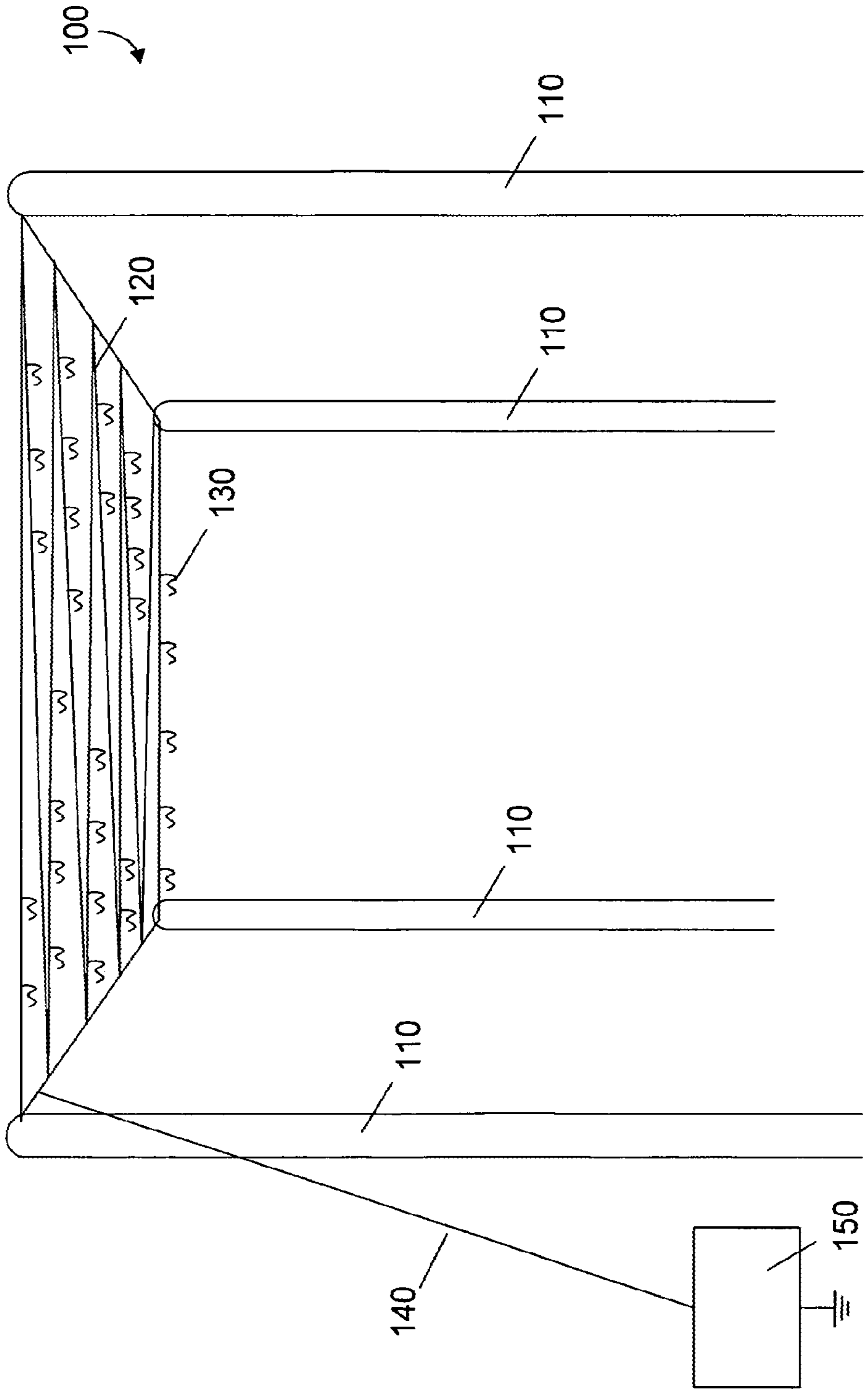


FIGURE 2

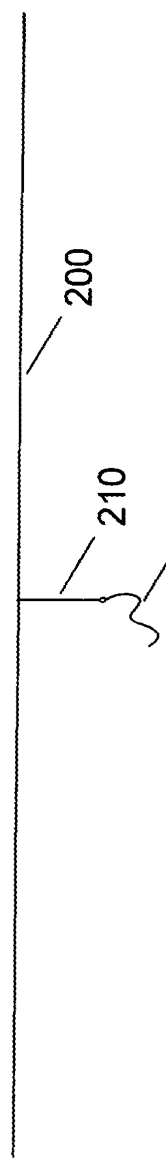


FIGURE 2A

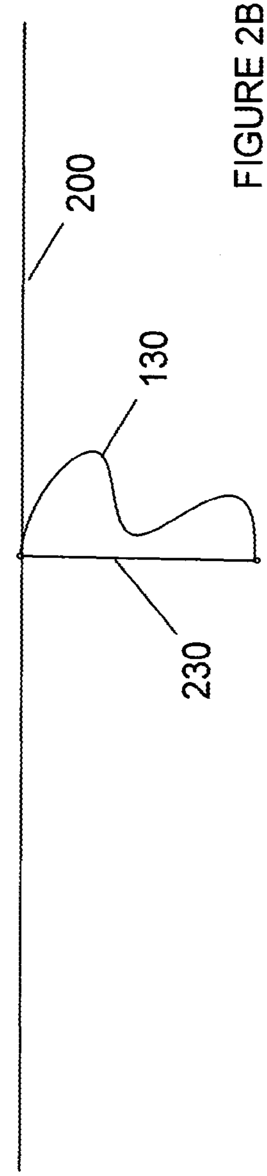


FIGURE 2B

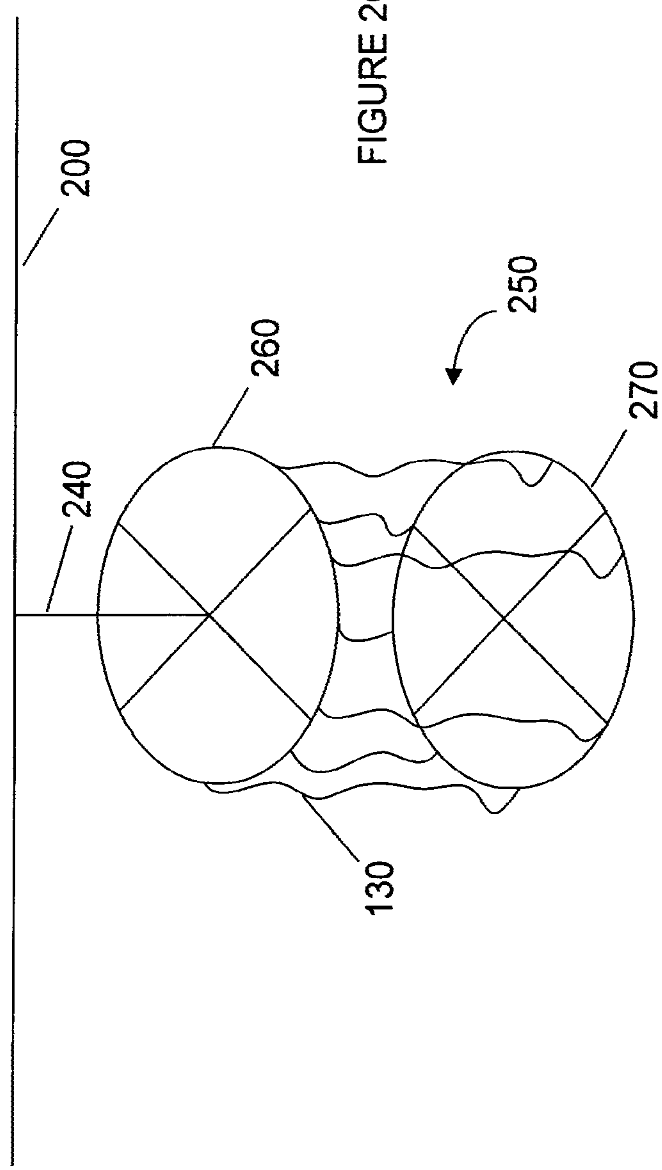


FIGURE 2C

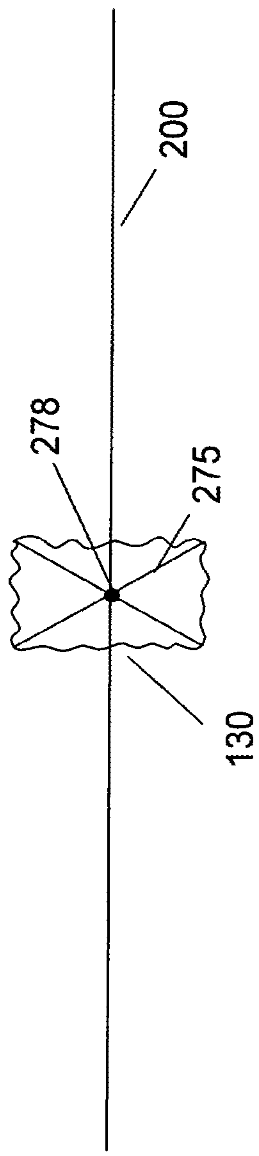


FIGURE 2D

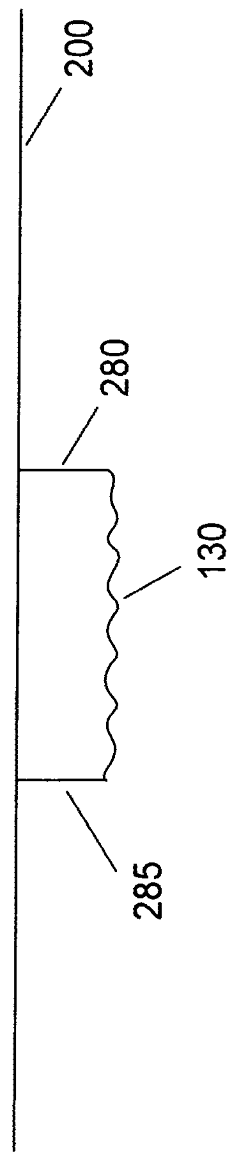


FIGURE 2E

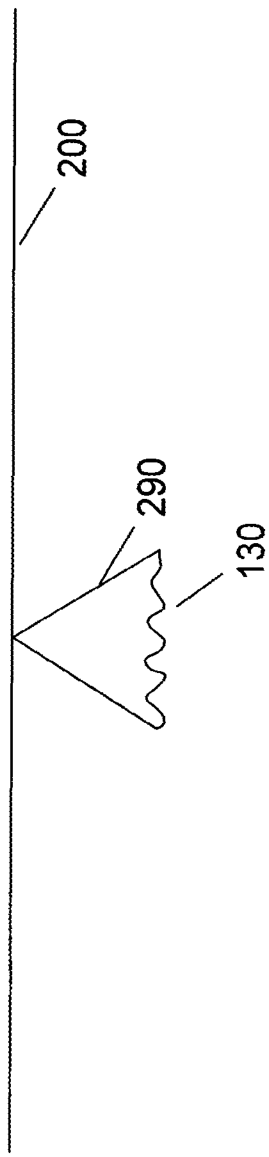


FIGURE 2F

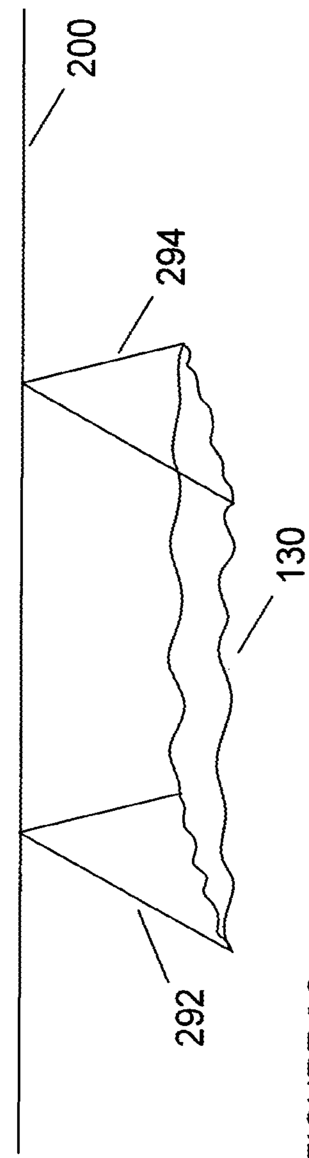


FIGURE 2G

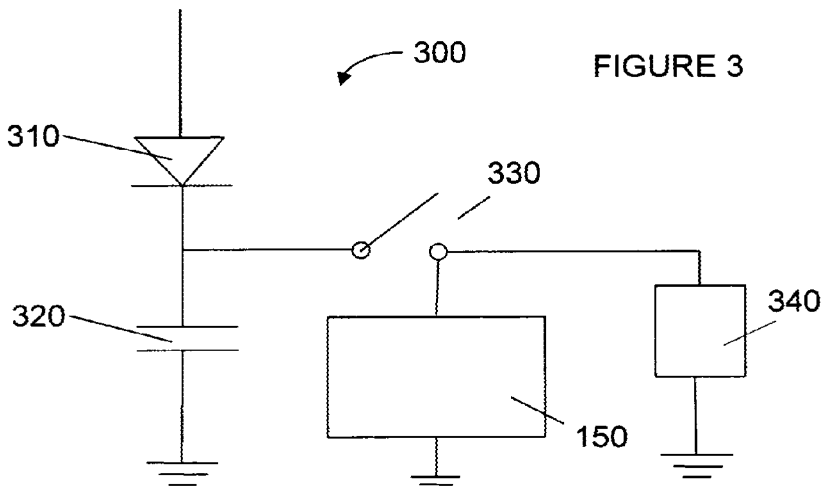


FIGURE 3

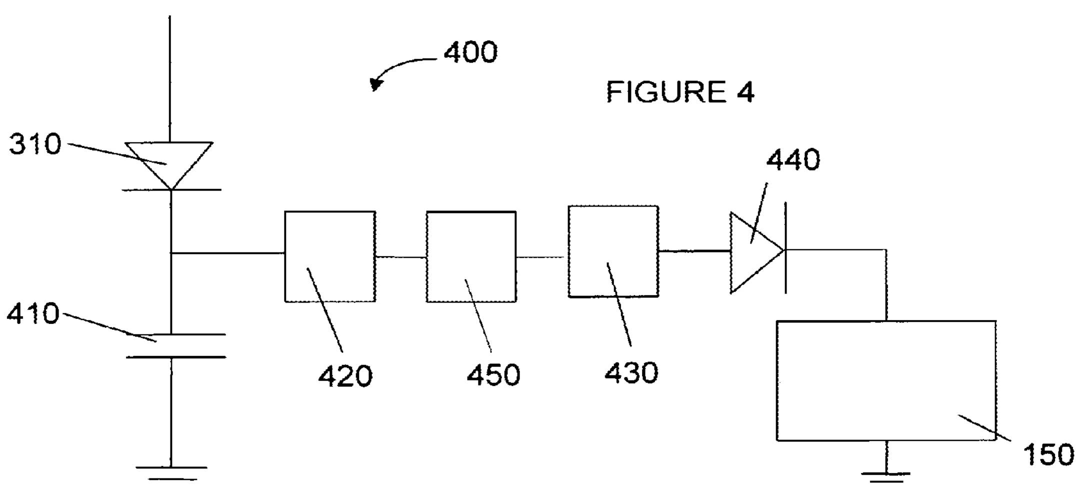


FIGURE 4

FIGURE 5

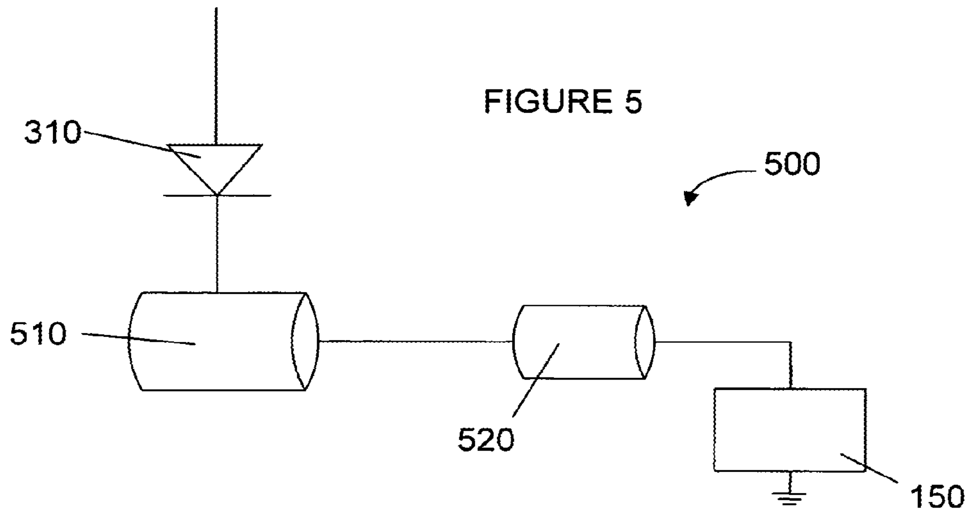


FIGURE 6

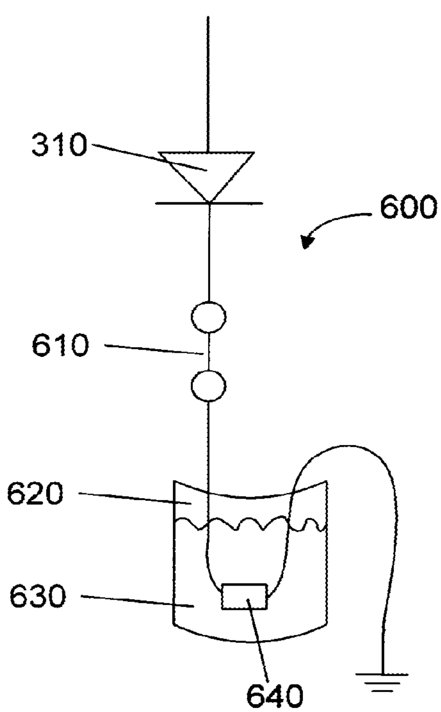
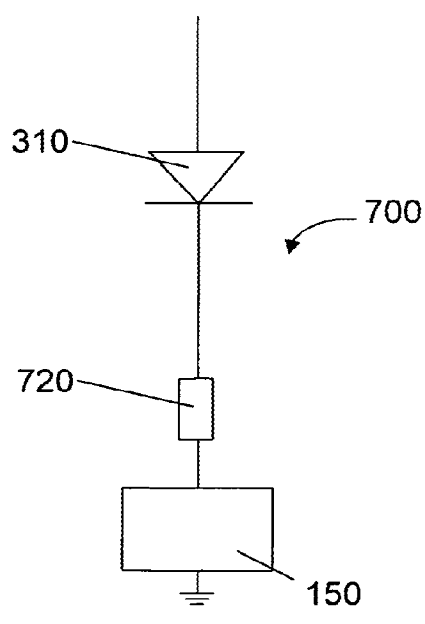


FIGURE 7



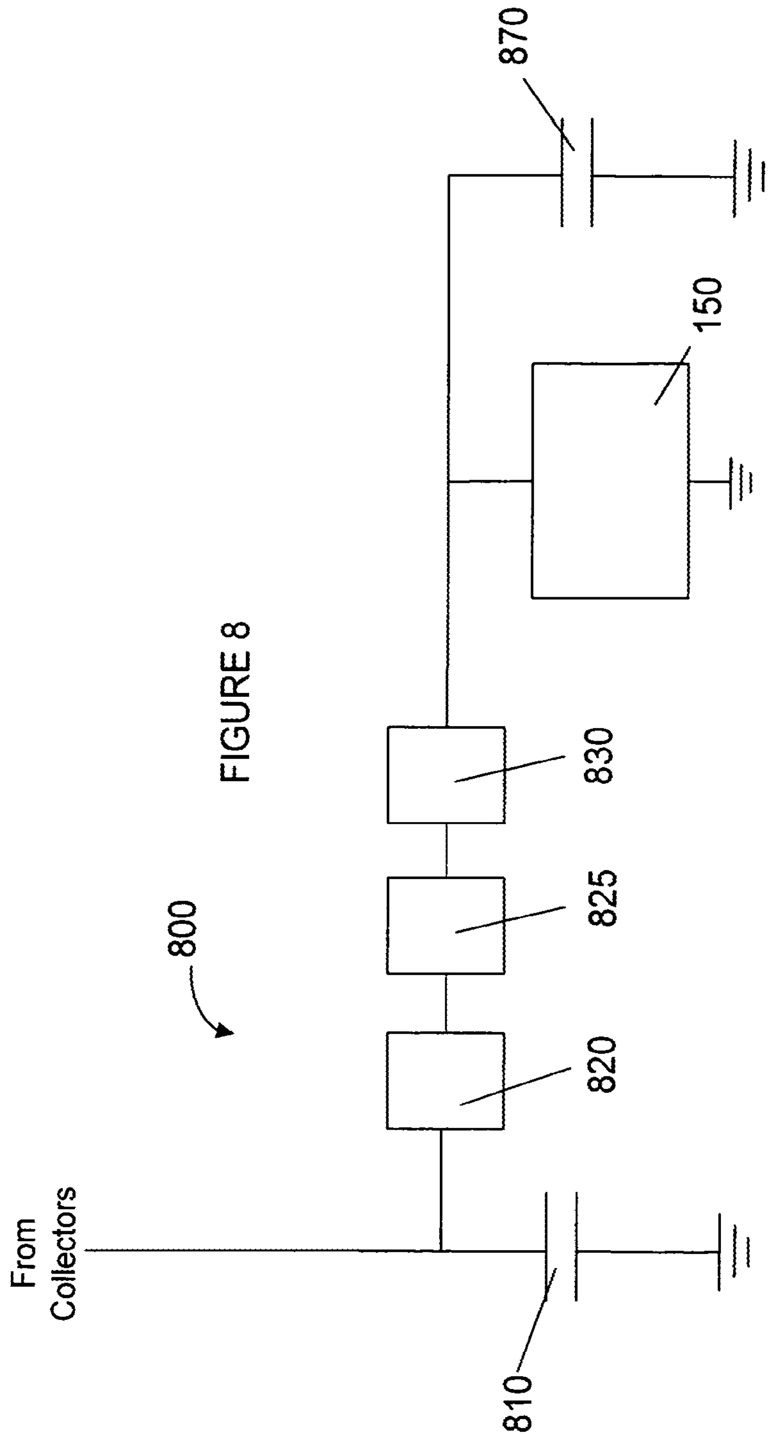


FIGURE 8

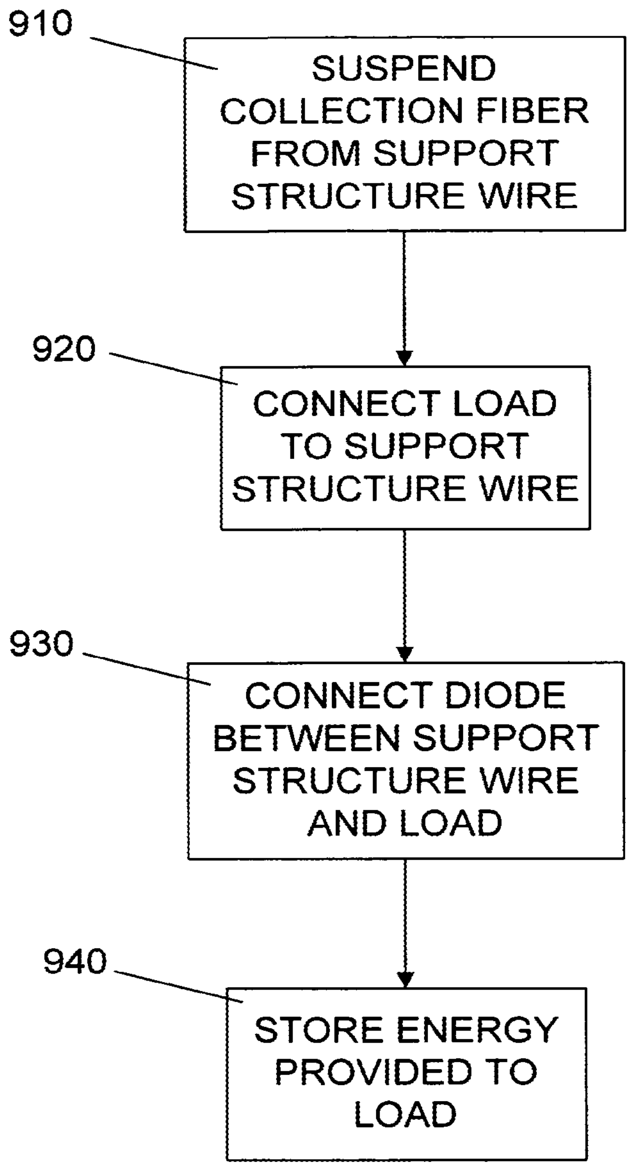

910
SUSPEND COLLECTION FIBER FROM SUPPORT STRUCTURE WIRE
920
CONNECT LOAD TO SUPPORT STRUCTURE WIRE
930
CONNECT DIODE BETWEEN SUPPORT STRUCTURE WIRE AND LOAD
940
STORE ENERGY PROVIDED TO LOAD

FIGURE 9

ENERGY COLLECTION

CROSS REFERENCE TO RELATED APPLICATIONS

This application is a continuation application of U.S. patent application Ser. No. 12/255,130, filed on Oct. 21, 2008 (now U.S. Pat. No. 8,686,575, issued on Apr. 1, 2014), which is a continuation application of U.S. patent application Ser. No. 11/358,264, filed on Feb. 21, 2006 (now U.S. Pat. No. 7,439,712, issued on Oct. 21, 2008), which are incorporated by reference herein.

TECHNICAL FIELD

The present disclosure is generally related to energy and, more particularly, is related to systems and methods for collecting energy.

BACKGROUND

The concept of fair weather electricity deals with the electric field and the electric current in the atmosphere propagated by the conductivity of the air. Clear, calm air carries an electrical current, which is the return path for thousands of lightening storms simultaneously occurring at any given moment around the earth. For simplicity, this energy may be referred to as static electricity or static energy. FIG. **1** illustrates a weather circuit for returning the current from lightning, for example, back to ground **10**. Weather currents **20**, **30** return the cloud to ground current **40**.

In a lightening storm, an electrical charge is built up, and electrons arc across a gas, ionizing it and producing the lightening flash. As one of ordinary skill in the art understands, the complete circuit requires a return path for the lightening flash. The atmosphere is the return path for the circuit. The electric field due to the atmospheric return path is relatively weak at any given point because the energy of thousands of electrical storms across the planet are diffused over the atmosphere of the entire Earth during both fair and stormy weather. Other contributing factors to electric current being present in the atmosphere may include cosmic rays penetrating and interacting with the earth's atmosphere, and also the migration of ions, as well as other effects yet to be fully studied.

Some of the ionization in the lower atmosphere is caused by airborne radioactive substances, primarily radon. In most places of the world, ions are formed at a rate of 5-10 pairs per cubic centimeter per second at sea level. With increasing altitude, cosmic radiation causes the ion production rate to increase. In areas with high radon exhalation from the soil (or building materials), the rate may be much higher.

Alpha-active materials are primarily responsible for the atmospheric ionization. Each alpha particle (for instance, from a decaying radon atom) will, over its range of some centimeters, create approximately 150,000-200,000 ion pairs.

While there is a large amount of usable energy available in the atmosphere, a method or apparatus for efficiently collecting that energy has not been forthcoming. Therefore, a heretofore unaddressed need exists in the industry to address the aforementioned deficiencies and inadequacies.

SUMMARY

Embodiments of the present disclosure provide systems and methods for collecting energy. Briefly described in architecture, one embodiment of the system, among others, can be implemented by a support structure wire elevated above a ground level, at least one collection fiber electrically connected to the support structure wire; a load electrically connected to the support structure wire; and a diode electrically connected between the load and at least one collection fiber.

Embodiments of the present disclosure can also be viewed as providing methods for collecting energy. In this regard, one embodiment of such a method, among others, can be broadly summarized by the following steps: suspending at least one collection fiber from a support structure wire elevated above ground level, the fiber electrically connected to the support structure wire; providing a load with an electrical connection to the support structure wire to draw current; and providing a diode electrically connected between the collection fiber and the load.

Other systems, methods, features, and advantages of the present disclosure will be or become apparent to one with skill in the art upon examination of the following drawings and detailed description. It is intended that all such additional systems, methods, features, and advantages be included within this description, be within the scope of the present disclosure, and be protected by the accompanying claims.

BRIEF DESCRIPTION OF THE DRAWINGS

Many aspects of the disclosure can be better understood with reference to the following drawings. The components in the drawings are not necessarily to scale, emphasis instead being placed upon clearly illustrating the principles of the present disclosure. Moreover, in the drawings, like reference numerals designate corresponding parts throughout the several views.

FIG. **1** is a circuit diagram of a weather energy circuit.

FIG. **2** is a perspective view of an exemplary embodiment of many energy collectors elevated above ground by a structure.

FIG. **2**A is a side view of an energy collection fiber suspended from a support wire.

FIG. **2**B is a side view of an exemplary embodiment of an energy collection fiber suspended from a support wire and with an additional support member.

FIG. **2**C is a perspective view of a support structure for multiple energy collection fibers.

FIG. **2**D is a side view of an exemplary embodiment of a support structure for multiple energy collection fibers.

FIG. **2**E is a side view of a support structure for an energy collection fiber.

FIG. **2**F is a side view of an exemplary embodiment of a support structure for an energy collection fiber.

FIG. **2**G is a side view of a support structure for multiple energy collection fibers.

FIG. **3** is a circuit diagram of an exemplary embodiment of a circuit for the collection of energy.

FIG. **4** is a circuit diagram of an exemplary embodiment of a circuit for the collection of energy.

FIG. **5** is a circuit diagram of an exemplary embodiment of an energy collection circuit for powering a generator and motor.

FIG. **6** is a circuit diagram of an exemplary embodiment of a circuit for collecting energy and using it for the production of hydrogen and oxygen.

FIG. **7** is a circuit diagram of an exemplary embodiment of a circuit for collecting energy, and using it for driving a fuel cell.

FIG. **8** is a circuit diagram of an exemplary embodiment of a circuit for collecting energy.

FIG. **9** is a flow diagram of an exemplary embodiment of collecting energy with a collection fiber.

DETAILED DESCRIPTION

Electric charges on conductors reside entirely on the external surface of the conductors, and tend to concentrate more around sharp points and edges than on flat surfaces. Therefore, an electric field received by a sharp conductive point may be much stronger than a field received by the same charge residing on a large smooth conductive shell. An exemplary embodiment of this disclosure takes advantage of this property, among others, to collect and use the energy generated by an electric field in the atmosphere. Referring to collection system **100** presented in FIG. **2**, at least one collection device **130** may be suspended from a support wire system **120** supported by poles **110**. Collection device **130** may comprise a diode or a collection fiber individually, or the combination of a diode and a collection fiber. Support wire system **120** may be electrically connected to load **150** by connecting wire **140**. Supporting wire system **120** may be any shape or pattern. Also, conducting wire **140** may be one wire or multiple wires. The collection device **130** in the form of a fiber may comprise any conducting or non-conducting material, including carbon, graphite, Teflon, and metal. An exemplary embodiment utilizes carbon or graphite fibers for static electricity collection. Support wire system **120** and connecting wire **140** can be made of any conducting material, including aluminum or steel, but most notably, copper. Teflon may be added to said conductor as well, such as non-limiting examples of a Teflon impregnated wire, a wire with a Teflon coating, or Teflon strips hanging from a wire. Conducting wire **120**, **140**, and **200** may be bare wire, or coated with insulation as a non-limiting example. Wires **120** and **140** are a means of transporting the energy collected by collection device **130**.

An exemplary embodiment of the collection fibers as collection device **130** includes graphite or carbon fibers. Graphite and carbon fibers, at a microscopic level, can have hundreds of thousands of points. Atmospheric electricity may be attracted to these points. If atmospheric electricity can follow two paths where one is a flat surface and the other is a pointy, conductive surface, the electrical charge will be attracted to the pointy, conductive surface. Generally, the more points that are present, the higher energy that can be gathered. Therefore, carbon, or graphite fibers are examples that demonstrate exemplary collection ability.

In at least one exemplary embodiment, the height of support wire **120** may be an important factor. The higher that collection device **130** is from ground, the larger the voltage potential between collection device **130** and electrical ground. The electric field may be more than **100** volts per meter under some conditions. When support wire **120** is suspended in the air at a particular altitude, wire **120** will itself collect a very small charge from ambient voltage. When collection device **130** is connected to support wire **120**, collection device **130** becomes energized and transfers the energy to support wire **120**.

A diode, not shown in FIG. **2**, may be connected in several positions in collection system **100**. A diode is a component that restricts the direction of movement of charge carriers. It allows an electric current to flow in one direction, but essentially blocks it in the opposite direction. A diode can be thought of as the electrical version of a check valve. The diode may be used to prevent the collected energy from discharging into the atmosphere through the collection fiber embodiment of collection device **130**. An exemplary embodiment of the collection device comprises the diode with no collection fiber. A preferred embodiment, however, includes a diode at the connection point of a collection fiber to support system **120** such that the diode is elevated above ground. Multiple diodes may be used between collection device **130** and load **150**. Additionally, in an embodiment with multiple fibers, the diodes restricts energy that may be collected through one fiber from escaping through another fiber.

Collection device **130** may be connected and arranged in relation to support wire system **120** by many means. Some non-limiting examples are provided in FIGS. **2**A-**2**G using a collection fiber embodiment. FIG. **2**A presents support wire **200** with connecting member **210** for collection device **130**. Connection member **210** may be any conducting material allowing for the flow of electricity from connection device **130** to support wire **200**. Then, as shown in FIG. **2**, the support wire **200** of support system **120** may be electrically connected through conducting wire **140** to load **150**. A plurality of diodes may be placed at any position on the support structure wire. A preferred embodiment places a diode at an elevated position at the connection point between a collection fiber embodiment of collection device **130** and connection member **210**.

Likewise, FIG. **2**B shows collection fiber **130** electrically connected to support wire **200** and also connected to support member **230**. Support member **230** may be connected to collection fiber **130** on either side. Support member **230** holds the fiber steady on both ends instead of letting it move freely. Support member **230** may be conducting or non-conducting. A plurality of diodes may be placed at any position on the support structure wire. A preferred embodiment places a diode at elevated position at the connection point between collection fiber **130** and support wire **200** or between fiber **130**, support member **230**, and support wire **200**.

FIG. **2**C presents multiple collection fibers in a squirrel cage arrangement with top and bottom support members. Support structure **250** may be connected to support structure wire **200** by support member **240**. Structure **250** has a top **260** and a bottom **270** and each of the multiple collection fibers **130** are connected on one end to top **260** and on the other end to bottom **270**. A plurality of diodes may be placed at any position on support structure **250**. A preferred embodiment places a diode at an elevated position at the connection point between collection fiber **130** and support structure wire **200**.

FIG. **2**D presents another exemplary embodiment of a support structure with support members **275** in an x-shape connected to support structure wire **200** at intersection **278** with collection fibers **130** connected between ends of support members **275**. A plurality of diodes may be placed at any position on the support structure. A preferred embodiment places a diode at an elevated position at the connection point between collection fiber **130** and support wire **200**.

FIG. **2**E provides another exemplary embodiment for supporting collection fiber **130**. Collection fiber **130** may be connected on one side to support member **285**, which may be connected to support structure wire **200** in a first location and on the other side to support member **280**, which may be connected to support structure wire **200** in a second location on support structure wire **200**. The first and second locations may be the same location, or they may be different locations, even on different support wires. A plurality of diodes may be placed at any position on the support structure. A preferred

embodiment places one or more diodes at elevated positions at the connection point(s) between collection fiber **130** and support wire **200**.

FIG. **2**F presents another exemplary embodiment of a support for a collection fiber. Two support members **290** may support either side of a collection fiber and are connected to support wire **200** in a single point. A plurality of diodes may be placed at any position on the support structure. A preferred embodiment places a diode at an elevated position at the connection point between collection fiber **130** and support wire **200**.

FIG. **2**G provides two supports as provided in FIG. **2**F such that at least two support members **292**, **294** may be connected to support structure wire **200** in multiple locations and collection fibers **130** may be connected between each end of the support structures. Collection fibers **130** may be connected between each end of a single support structure and between multiple support structures. A plurality of diodes may be placed at any position on the support structure. A preferred embodiment places one or more diodes at elevated positions at the connection point(s) between collection fiber **130** and support structure wire **200**.

FIG. **3** provides a schematic diagram of storing circuit **300** for storing energy collected by one or more collection devices (**130** from FIG. **2**). Load **150** induces current flow. Diode **310** may be electrically connected in series between one or more collection devices (**130** from FIG. **2**) and load **150**. A plurality of diodes may be placed at any position in the circuit. Switch **330** may be electrically connected between load **150** and at least one collection device (**130** from FIG. **2**) to connect and disconnect the load. Capacitor **320** maybe connected in parallel to the switch **330** and load **150** to store energy when switch **330** is open for delivery to load **150** when switch **330** is closed. Rectifier **340** may be electrically connected in parallel to load **150**, between the receiving end of switch **330** and ground. Rectifier **340** may be a full-wave or a half-wave rectifier. Rectifier **340** may include a diode electrically connected in parallel to load **150**, between the receiving end of switch **330** and ground. The direction of the diode of rectifier **340** is optional.

In an exemplary embodiment provided in FIG. **4**, storage circuit **400** stores energy from one or more collection devices (**130** from FIG. **2**) by charging capacitor **410**. If charging capacitor **410** is not used, then the connection to ground shown at capacitor **410** is eliminated. A plurality of diodes may be placed at any position in the circuit. Diode **310** may be electrically connected in series between one or more collection devices (**130** from FIG. **2**) and load **150**. Diode **440** may be placed in series with load **150**. The voltage from capacitor **410** can be used to charge spark gap **420** when it reaches sufficient voltage. Spark gap **420** may comprise one or more spark gaps in parallel. Non-limiting examples of spark gap **420** include mercury-reed switches and mercury-wetted reed switches. When spark gap **420** arcs, energy will arc from one end of the spark gap **420** to the receiving end of the spark gap **420**. The output of spark gap **420** may be electrically connected in series to rectifier **450**. Rectifier **450** may be a full-wave or a half-wave rectifier. Rectifier **450** may include a diode electrically connected in parallel to transformer **430** and load **150**, between the receiving end of spark gap **420** and ground. The direction of the diode of rectifier **450** is optional. The output of rectifier **450** is connected to transformer **430** to drive load **150**.

FIG. **5** presents motor driver circuit **500**. One or more collection devices (**130** from FIG. **2**) are electrically connected to static electricity motor **510**, which powers generator **520** to drive load **150**. A plurality of diodes may be placed at any position in the circuit. Motor **510** may also be directly connected to load **150** to drive it directly.

FIG. **6** demonstrates a circuit **600** for producing hydrogen. A plurality of diodes maybe placed at any position in the circuit. One or more collection devices (**130** from FIG. **2**) are electrically connected to primary spark gap **610**, which may be connected to secondary spark gap **640**. Non-limiting examples of spark gaps **610**, **640** include mercury-reed switches and mercury-wetted reed switches. Secondary spark gap **640** may be immersed in water **630** within container **620**. When secondary spark gap **640** immersed in water **630** is energized, spark gap **640** may produce bubbles of hydrogen and oxygen, which may be collected to be used as fuel.

FIG. **7** presents circuit **700** for driving a fuel cell. A plurality of diodes may be placed at any position in the circuit. Collection devices (**130** from FIG. **2**) provide energy to fuel cell **720** which drives load **150**. Fuel cell **720** may produce hydrogen and oxygen.

FIG. **8** presents exemplary circuit **800** for the collection of energy. Storage circuit **800** stores energy from one or more collection devices (**130** from FIG. **2**) by charging capacitor **810**. If charging capacitor **810** is not used, then the connection to ground shown at capacitor **810** is eliminated. A plurality of diodes may be placed at any position in the circuit. The voltage from capacitor **810** can be used to charge spark gap **820** when it reaches sufficient voltage. Spark gap **820** may comprise one or more spark gaps in parallel or in series. Non-limiting examples of spark gap **820** include mercury-reed switches and mercury-wetted reed switches. When spark gap **820** arcs, energy will arc from one end of spark gap **820** to the receiving end of spark gap **820**. The output of spark gap **820** may be electrically connected in series to rectifier **825**. Rectifier **825** may be a full-wave or a half-wave rectifier. Rectifier **825** may include a diode electrically connected in parallel to inductor **830** and load **150**, between the receiving end of spark gap **820** and ground. The direction of the diode of rectifier **825** is optional. The output of rectifier **825** is connected to inductor **830**. Inductor **830** may be a fixed value inductor or a variable inductor. Capacitor **870** may be placed in parallel with load **150**.

FIG. **9** presents a flow diagram of a method for collecting energy. In block **910**, one or more collection devices may be suspended from a support structure wire. In block **920**, a load may be electrically connected to the support structure wire to draw current. In block **930** a diode may be electrically connected between the support structure wire and the electrical connection to the load. In block **940**, energy provided to the load may be stored or otherwise utilized.

Any process descriptions or blocks in flow charts should be understood as representing modules, segments, or portions of code which include one or more executable instructions for implementing specific logical functions or steps in the process, and alternate implementations are included within the scope of the preferred embodiment of the present disclosure in which functions may be executed out of order from that shown or discussed, including substantially concurrently or in reverse order, depending on the functionality involved, as would be understood by those reasonably skilled in the art of the present disclosure.

It should be emphasized that the above-described embodiments of the present disclosure, particularly, any "preferred" embodiments, are merely possible examples of implementations, merely set forth for a clear understanding of the principles of the disclosure. Many variations and modifications may be made to the above-described embodiment(s) of

the disclosure without departing substantially from the spirit and principles of the disclosure. All such modifications and variations are intended to be included herein within the scope of this disclosure and the present disclosure and protected by the following claims.

Therefore, at least the following is claimed:

1. A method of collecting energy comprising:

suspending at least one ion collection device with, in operation, microscopic points of a cross section of the collection device exposed to the environment from a support structure; and

providing a load with an electrical connection to the at least one collection device to draw current.

2. The method of claim **1**, wherein the ion collection device comprises a diode.

3. The method of claim **1**, wherein the ion collection device comprises a collection fiber.

4. The method of claim **3**, wherein the collection fiber comprises carbon fiber and/or graphite fiber.

5. The method of claim **1**, wherein the ion collection device comprises a diode and a collection fiber and the diode is electrically connected between the collection fiber and the load.

6. The method of claim **1**, further comprising storing energy provided to the load in an energy storage device.

7. The method of claim **6**, wherein storing energy provided to the load comprises storing energy in a capacitor or an inductor.

8. A system of energy collection comprising:

a support structure;

at least one ion collection device with, in operation, microscopic points of a cross section of the collection device exposed to the environment, the ion collection device electrically connected to and suspended from the support structure; and

a load electrically connected to the at least one ion collection device.

9. The system of claim **8**, wherein the ion collection device comprises a diode.

10. The system of claim **9**, wherein the diode is elevated relative to the ground level.

11. The system of claim **10**, wherein the collection fiber comprises a carbon fiber or a graphite fiber.

12. The system of claim **8**, wherein the ion collection device comprises a collection fiber.

13. The system of claim **8**, wherein the ion collection device comprises a collection fiber and a diode electrically connected between the load and the collection fiber.

14. The system of claim **8**, further comprising a diode electrically connected between the at least one ion collection device and the support structure.

15. The system of claim **8**, further comprising:

a switch connected in series between the at least one ion collection device and the load; and

a capacitor connected in parallel with the switch and the load.

16. The system of claim **15**, wherein the switch comprises an interrupter connected between the at least one ion collection device and the load, the interrupter comprising at least one of a fluorescent tube, a neon bulb, an AC light, and a spark gap.

17. The system of claim **16**, further comprising a transformer connected between the interrupter and the load.

18. The system of claim **8**, further comprising: a motor for providing power, the motor connected between the at least one ion collection device and the load; and a generator powered by the motor.

19. The system of claim **8**, further comprising a fuel cell electrically connected between the ion collection device and the load.

20. The system of claim **19**, wherein the fuel cell produces hydrogen and oxygen.

21. A system of collecting energy comprising:

means for suspending at least one ion collection device with, in operation, microscopic points of a cross section of the collection device exposed to the environment;

means for inducing current flow, the means for inducing current flow electrically connected to at least one ion collection device; and

means for restricting the backflow of charge carriers, the means for restricting the backflow of charge carriers electrically connected between the at least one collection device and the means for inducing current flow.

* * * * *